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# Detection and Control of Epidemic Cholera

## Epidemiology

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**CDC**  
Centers for Disease  
Control and  
Prevention

# Cholera

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- Diarrhea disease caused by *Vibrio cholerae*
- Since 1800, cholera has spread through world in 7 large waves (pandemics)
- Transmitted through fecally contaminated water or food
- Treated with rapid oral or intravenous fluid and electrolyte replacement

# Cholera Map

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# Cholera in Africa

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- 7th pandemic began in Indonesia in 1961, reached Africa in 1970
- 1971: 25 African countries reported cholera
  - (> 72,000 cases and 11,000 deaths)
  - overall CFR of 16%, as high as 35%
- 3,000-43,000 cases / year since 1971
- 1991: large epidemic
  - 14 countries
  - (>100,000 cases and 10,000 deaths)

# Epidemic vs. Endemic Cholera

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- Epidemic cholera
  - sudden increase in the number of cases of cholera over usual number
  - may be imported
  
- Endemic cholera
  - persistent, recurrent problem, occasional cases
  - public health officials should be aware of the usual rate of cholera in the area
  - an epidemic (increase in # of cases) may also occur in area where cholera is endemic

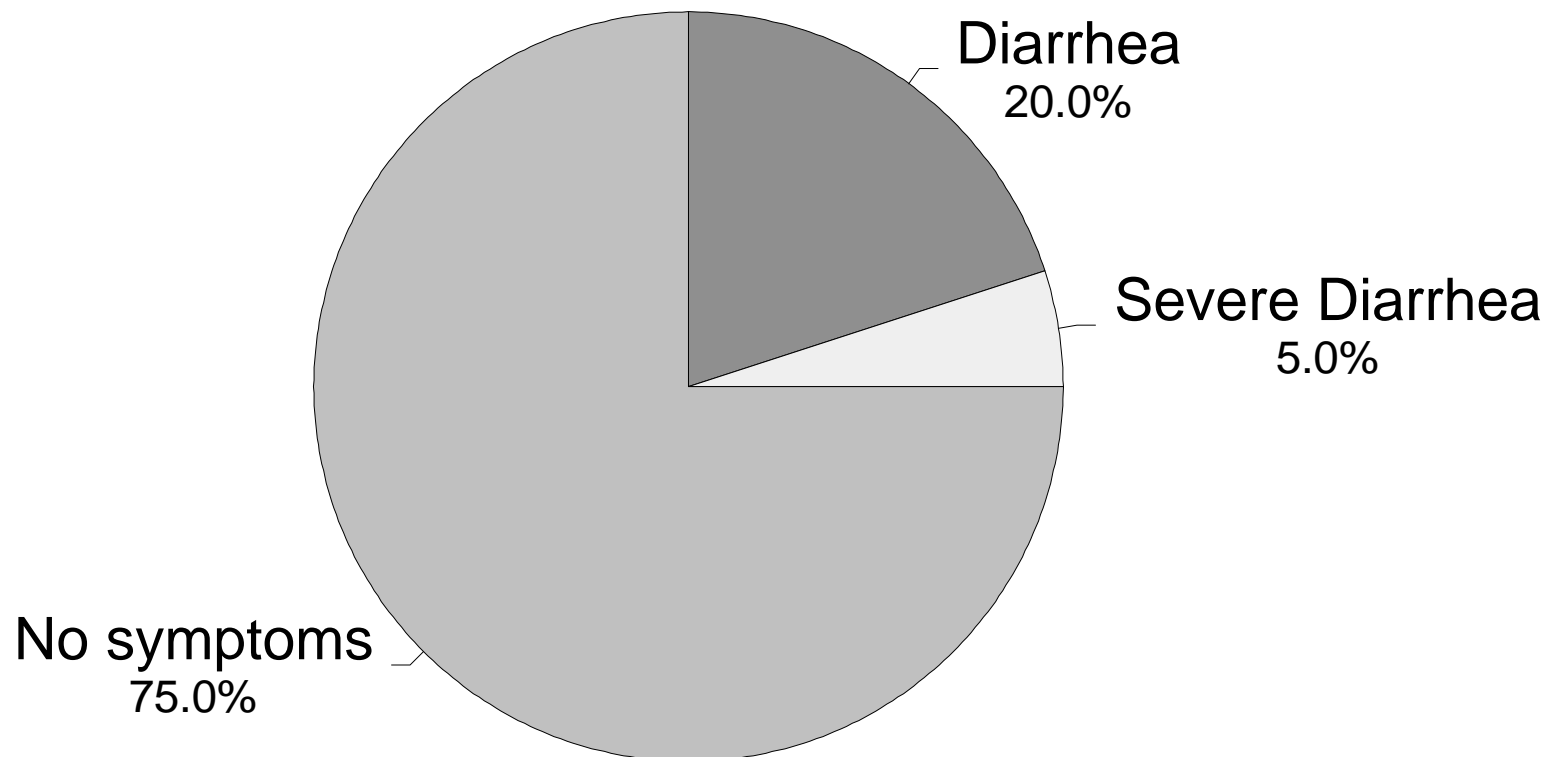
# Clinical Presentation of Cholera

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- Symptomatic cholera
  - acute watery diarrhea
  - profuse, "rice water" stools
  - no fever, no abdominal cramps
  - vomiting and leg cramps common
  
- Dehydration
  - can lose up to 10% of body weight
  - fluid losses up to 1 liter / hour
  - must replace fluids and electrolytes to avoid hypovolemic shock, renal failure and death

# Clinical Spectrum of Cholera

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# Modes of Transmission

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- Fecal-oral route
  - dose of  $>1,000,000$  organisms required
  - direct person-to-person transmission rare
- Contaminated Water
- Contaminated Food

# Common Sources of Infection

## - Water -

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- Contaminated at its source
  - shallow wells, surface water
  - *V. cholerae* can live for years in some aquatic environments
  
- Contaminated in the home / after storage
  - when inadequately washed hands come in contact with stored water
  - if wash utensils in contaminated water
  - if bathe in contaminated water

# Common Sources of Infection

## Food contaminated during or after preparation

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- Moist grains served at room temperature or lightly heated
- Moist food is excellent environment for growth of *V. cholerae*
- Acidifying foods inhibits growth of *V. cholerae*
  - with lemons, tomatoes, yogurt or fermented milk

# **Common Sources of Infection**

## **Fruits and Vegetables**

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- **Grown at or near ground level and**
  - fertilized with night-soil
  - irrigated with water containing human waste
  - "freshened" with contaminated water
  - eaten raw

# Factors Favoring Epidemic Cholera

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- Environmental factors
- Host factors
- Serogroup

# Factors Favoring Epidemic Cholera

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## ■ Environmental Factors

- High Risk
  - areas without safe water supply
  - areas without good sanitation
- Seasonality not well understood
  - near equator, may be rainy or dry
  - in a given locale, may be predictable

# Factors Favoring Epidemic Cholera

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## ■ Host Factors

- Protection against cholera:
  - immunity due to previous infection
  - breast-feeding (in endemic areas)
- Higher risk
  - persons taking antacids or with reduced gastric acid

# Factors Favoring Epidemic Cholera

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- The organism
  - Only serogroups 01 and 0139 cause epidemics
    - other serogroups can cause diarrhea, but not epidemics